

L7 ANSWER 3 OF 4 MEDLINE DUPLICATE 3  
 ACCESSION NUMBER: 97130228 MEDLINE  
 DOCUMENT NUMBER: 97130228 PubMed ID: 8976049  
 TITLE: Construction and characterization of the direct  
**piezoelectric** immunosensor for atrazine operating  
 in solution.  
 AUTHOR: Steegborn C; Skladal P  
 CORPORATE SOURCE: Department of Biochemistry, Masaryk University, Brno, Czech  
 Republic.  
 SOURCE: BIOSENSORS AND BIOELECTRONICS, (1997) 12 (1) 19-27.  
 Journal code: 9001289. ISSN: 0956-5663.  
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AB The direct immunosensor for determination of the herbicide atrazine was  
 studied. The gold electrodes of the **piezoelectric** quartz  
 crystal were silanized and activated using glutaraldehyde. The  
 bioaffinity **ligand** atrazine was linked through albumin as a  
 spacer molecule. The modified **piezoelectric** crystal was placed  
 in a flow cell and all measurements were performed directly in flowing  
 solution. The interaction of the anti atrazine monoclonal antibody (MAb,  
 clone D6F3) with the immobilized atrazine was characterized using both  
 crude ascitic fluid and Protein A-purified MAb preparates. The  
 association and dissociation rate constants were determined,  $k_a = 1.21 \times$   
 $10(5) \text{ M}^{-1}\text{S}^{-1}$  and  $k_d = 4.0 \times 10(-4)\text{S}^{-1}$ . The competitive determination of  
 free atrazine was studied using different dilutions (100x, 250x and 1000x)  
 of the ascitic fluid containing MAb. MAb was preincubated with atrazine  
 (concentrations 0-1 microgram/l) for 15 min and the mixture was then  
 introduced to the flow cell. As a signal, either the rate of frequency  
 decrease or the relative change of frequency after the fixed binding  
 period (10 min) was evaluated. As expected, the higher dilutions of MAb  
 provided improved sensitivity for the analyte. For the 1000x diluted  
 ascitic fluid, 0.1 and 1 microgram/l atrazine caused 5 and 30% decreases  
 of the relative binding of MAb, respectively. Repeated use of the  
 crystals was achieved using a 5 min flow of 100 mM NaOH for regeneration.  
 The results obtained seem to be promising for determination of atrazine in  
 drinking water using direct **piezoelectric** immunosensors.

L7 ANSWER 4 OF 4 MEDLINE DUPLICATE 4  
 ACCESSION NUMBER: 97051663 MEDLINE  
 DOCUMENT NUMBER: 97051663 PubMed ID: 8896324  
 TITLE: Activating **piezoelectric** crystal surface by  
 silanization for microgravimetric immunobiosensor  
 application.  
 AUTHOR: Suri C R; Mishra G C  
 CORPORATE SOURCE: Institute of Microbial Technology, Chandigarh, India.  
 SOURCE: BIOSENSORS AND BIOELECTRONICS, (1996) 11 (12) 1199-205.  
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 PUB. COUNTRY: ENGLAND: United Kingdom  
 DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)  
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AB The development of a microgravimetric immunobiosensor using a  
**piezoelectric** quartz crystal as a detector requires a stable and

reproducible immobilization method for **ligand** binding. The method of silanization using 3-aminopropyltriethoxysilane (APTES) has been widely used for activating the carrier surface. In the present study, APTES deposition on a **piezoelectric** crystal surface was studied under various solvent conditions. A fluorescence method, using fluorescence isothiocyanate as a dye, was demonstrated for the quantification of amino groups on the silanized **piezoelectric** crystal surface. The optimum binding conditions of APTES deposition on a **piezoelectric** crystal surface were incorporated for the covalent immobilization of protein on the crystal surface in developing a stable and sensitive microgravimetric immunobiosensor. Determination of immunoglobulin G (IgG) concentration was performed using APTES modified **piezoelectric** crystals coated with protein G. The resonant frequency shift, resulting from the formation of protein G-IgG complex on the crystal surface, correlated with the concentration of IgG in the range 10 ng/ml to 0.1 mg/ml. The APTES modified, protein G coated crystal were found to be quite stable and did not show a significant loss of sensitivity even after 12 weeks of storage at 4 degrees C in a desiccator.